

ASSESSMENT OF REPRODUCTIVE PROBLEMS IN SOME RUMINANTS UNDER SMALL-HOLDER HUSBANDRY SYSTEM IN BAUCHI, NIGERIA

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ABSTRACT

This study collated four-year data (2005 – 2008) on the incidence of some reproductive problems in some farm ruminants (cattle, sheep and goats) as influenced by species, season, age and year. The data were subjected to simple descriptive statistics and chi-square analysis. The reproductive problems studied were dystocia, retained placenta, vaginal prolapse, orchitis, abortion, pregnancy toxemia, uterine prolapse and hypocalcaemia. The results showed that there was a significant ($P < 0.01$) species effect on the incidence of these problems. For instance, the incidence of dystocia was 0.0, 23.8 and 20.7 % in cattle, sheep and goats, respectively. Incidence of retained placenta was highest in cattle (61.9%) followed by goats (34.0%) and lowest in sheep (15.1%). Vaginal prolapse recorded the highest incidence in sheep followed by goats and lowest in cattle. Orchitis was highest in goats followed by sheep with the least incidence in cattle. Similarly, there were more cases of abortion in goats (26.0%) as compared to cattle (19.0%) and sheep (7.6%). The results on incidence of pregnancy toxemia and hypocalcaemia revealed that the sheep had higher cases than goats and cattle. The results showed that incidence of these problems as affected by season did not differ significantly in the three species. Similarly, there was no significant effect on these problems with respect to year (2005, 2006, 2007 and 2008) of occurrence. Age had significant ($P < 0.05$) effect on the incidence these problems. For instance, the young animals were more prone to vaginal prolapse, abortion and dystocia then followed by adults, and the old having the lowest incidence. Cases of orchitis, pregnancy toxemia, hypocalcaemia, uterine prolapse and retained placenta were more common in adults than in young and old animals. However, the frequency of vaginal prolapse, abortion and uterine prolapse were very low in the old as compared to other animals (young and adults). This study concludes that these ruminants (cattle, sheep and goats) managed under the smallholder husbandry system experienced colossal occurrence of these problems which relegated them to reduced reproductive status. It is suggested that improved management practices in terms of good nutrition, provision of adequate housing and prompt control of pests and diseases would go a long way towards addressing the incidence of these problems in smallholder flocks.

KEYWORDS: Species, season, sex, age, year, reproductive problem

INTRODUCTION

Nigeria as well as many developing countries has for a long time been plagued with the problem of a worsening situation of inadequate consumption of animal protein. Average consumption rate of animal protein in Nigeria is estimated at 4.5 grams per head per day against the minimum recommended 35g/day (Onyimonyi and Ene, 2003).

Nutrition is perhaps the most important consideration in livestock production and management. Most of the reproductive problems and disorders in farms animals are associated with bad management. This is evident in the forms of inadequate feeding, poor housing, pests and diseases, among others. However, one of the major improvement objectives in livestock production, particularly ruminant animals is to increase the number of young weaned per dam which is dependent on the number of newborn per parturition. This in turn depends on the number of ova and foetuses which die during pregnancy and the birth process (Allan and Stamp, 1987). The causes of embryonic death early in pregnancy are not well understood, but in general dams in good body condition at mating have a lower

rate of embryonic mortality than dams in poor condition (Allan and Stamp, 1987), and they also have decreased incidence of reproductive problems (Zahraddeen *et al.*, 2007).

Reproductive performance of ruminants in the tropics is hampered by several factors such as genotype (Zahraddeen, 2006), season (Butswat, 1994; Zahraddeen *et al.*, 2007), nutrition (Malau-Aduli *et al.*, 2004), diseases and pests (Butswat *et al.*, 2005) and lack of technical know-how (Zahraddeen, 2006). For instance, Wilson (1989) reported that in the traditional husbandry system no special care is given to the breeding stock and this has resulted in reduced reproductivity. Assessment of the reproductive performance of animals, especially ruminants, will go a long way in alleviating the current animal protein shortage in the country. Available information on reproductive problems in these species are mostly from research stations and government farms (Butswat *et al.*, 2001; Zahraddeen *et al.*, 2007) from smallholder husbandry is practically not available in literature in the study area.

Data on reproductive performance of ruminants in Nigeria clearly indicate that these animals are far from expressing their biological potential for rate and efficiency. This study has become imperative to investigate some of the factors militating against achieving this goal. This research work was designed to investigate incidence of reproductive problems in these animals (cattle, sheep and goats) as influenced by sex, season, year and age in smallholder flocks in Bauchi.

MATERIALS AND METHODS

Location and Climate

Bauchi metropolis, the study area, apart from being the headquarters of Bauchi Local Government and Bauchi State, is also the urban centre in the State. It lies on latitude 10° 17' north, longitude 8° 49' east and at an altitude of 690.2 metres above sea level in the northern guinea savannah ecological zone of Nigeria (Kowal and Knabe, 1972). Bauchi State is estimated to have a human population of more than 4.6 million people (NPC, 2006). The society is mainly agrarian. The climate is suitable for agriculture, and exhibits two marked seasons; dry (October to March) and rainy (April to September) (Butswat, 1994). The annual rainfall is between 1016-1270 mm. The mean monthly hours of sunshine is highest in December (300.3h) and lowest in August (150.1h). April is the hottest month with mean maximum and minimum temperatures of 30.1 and 13.7 °C, respectively. The mean relative humidity is highest in August (74.0%) and lowest in February (16.5%) as reported by Butswat *et al.* (2000).

Source of data

The data for this study were sourced from Bauchi Main Veterinary Clinic along Ran Road. A total of 343 animals were used for the study, comprising cattle (21), sheep (172) and goats (150) which were brought to the Clinic over four years (2005 to 2008). Data on the incidence of reproductive problems were collected based on the observed clinical signs as well as from the veterinary record books. The detailed descriptions of these species have been reported by Osinowo (1990). The predominant cattle breed in the area was Bunaji and few other breeds were available. The sheep breed was mainly Yankasa, while Kano Brown was the commonest goat breed in the metropolis. These animals were brought to the Clinic by smallholder farmers who mostly practised the traditional system of husbandry.

Data collection

The data for this study were collected from Bauchi Main Veterinary Clinic. The nature of reproductive problems was taken according to the following criteria:-

- Dystocia was recorded if difficult parturition was noticed in which assistance was required in order to save the life of the dam and or its newborn.
- Abortion was recorded if pregnancy was terminated through the expulsion of the foetus of recognizable size (Butswat *et al.*, 2001).
- Retained placenta was recorded if after parturition the foetal membrane was not spontaneously released as described by Zahraddeen *et al.* (2007).
- Uterine prolapse was recorded if the uterus protruded through the vulva for hours after giving birth (Eusebio, 1980).
- Pregnancy toxemia was considered if the dam in late pregnancy (last six weeks of pregnancy) found standing apart from the rest of the flock and make no effort to move even when approached, and when forced to do so walked with a staggering gait in an aimless direction as though blind (Eusebio, 1980).

- Hypocalcaemia was recorded if the dam was at the last stage of pregnancy walked with a staggering gait was weak on its hind limbs, and breathing was often accelerated, probably due to restlessness and excitability of the animal (Eusebio, 1980).
- Orchitis was recorded if inflammation of the testicles occurred (Eusebio, 1980).

The reproductive problems were classified on the basis of species (cattle, sheep and goats), season (early dry, late dry, early wet and late wet), sex, year (2005-2008) and age. For the purpose of this study, the age was grouped into three; young, adult and old. For goats and sheep; < 24 months was taken as young, 24 to \leq 48 months as adults and > 48 months as old animals. The dentition method was used for the aging. In cattle, the young were \leq 3 years, > 3 to \leq 6 years as adults and old as > 6 years.

Statistical analysis

Data generated from this study were subjected to simple descriptive statistics to obtain mean and percentages, while other data were subjected to Chi-square analysis using species, sex, season, age and year as factors, as described by Humburg (1977).

RESULTS

Data on the incidence of reproductive problems as influenced by species are presented in Table 1. The results showed that there was significant ($P < 0.01$) species effect on the incidence of these problems. For instance, the incidence of dystocia was 0.0, 23.8 and 20.7 % for cattle, sheep and goats, respectively. Incidence of retained placenta was highest in cattle (61.9%) followed by goats (34.0%) and lowest in sheep (15.1%). Sheep had the highest per cent incidence of vaginal prolapse followed by goats and lowest in cattle. Occurrence of orchitis was highest in goat followed by sheep and least incidence in cattle. Similarly, there were higher cases of abortion in goats (26.0%) as compared to sheep (7.6%) and cattle (19.0%). However, the results on incidence of pregnancy toxemia and hypocalcaemia revealed that the sheep had higher cases of occurrence than goats and cattle. Data on incidence of these problems as affected by season are also depicted in Table 1. The results showed that incidence of dystocia, retained placenta, vaginal prolapse, orchitis, abortion, pregnancy toxemia, hypocalcaemia and uterine prolapse did not differ significantly with changes in season (Table 1).

Table 2 shows the incidence of some reproductive problems in some ruminants (cattle, sheep and goats) as influenced by sex, year and age. The results showed that there were significant ($P < 0.01$) sex effect on the overall incidence of these problems; females being more susceptible than males. However, there was no significant effect of these problems with respect to year of occurrence in these species studied. The results also showed that the incidence of these problems with respect to age of the animal (young, adult and old) differed significantly ($P < 0.05$). For instance, the young animals were more prone to vaginal prolapse, abortion and dystocia then followed by adults and lowest in old animals. However, incidence of orchitis, pregnancy toxemia, hypocalcaemia, uterine prolapse and retained placenta were higher in adults as compared to young and old animals. However, the incidence of vaginal prolapse, abortion and uterine prolapse were much lower in the old as compared to other animals (young and adults) (Table 2).

DISCUSSION

Incidence of some reproductive problems in some farm ruminants (cattle, sheep and goats) managed under the smallholder husbandry system in a part of northern guinea savannah ecological zone of Nigeria showed differential results in occurrence of these problems in the three species studied. Generally, the sheep had higher cases of these problems than the other two species. This high value may probably be linked with the differences in feeding habit of these animals. Sheep rarely select the type of grazing materials at their disposal, but goats are good selectors in their feeding habit. Therefore, this habit may account for the differences in their incidence of these problems. For instance, some plant materials may be highly toxic and if consumed by grazing animals in large quantity may predispose them to some of these problems. Peters and Ball (1995) reported that dietary deficiencies especially of vitamin E and selenium are known to cause retained placenta during the dry season. The high percentages of these problems in goats might also be due to the fact that this species does not like confinement or restriction for a prolonged period, and this predisposes them to wild grazing/browsing,

as it is the practice with the traditional smallholder husbandry system. This was similarly stated by Zahraddeen (2006) in his study with goats under improved management practices.

The lower incidence of these problems in cattle may be attributed to the fact that cattle were not left to fend for themselves as it is the case with sheep and goats where they might have access to some of these toxic plants. For instance, some problems such as dystocia, vaginal prolapse, orchitis and hypocalcaemia were virtually absent from the cattle investigated in the present study. This probably due to improved management conditions of cattle and they are not left to roam and fend for themselves as compared to sheep and goats. Previous studies with goats showed that incidence of reproductive problems were significantly influenced by breed as reported by Zahraddeen *et al.* (2007). This was similarly observed by Butswat *et al.* (2001) in crossbred cattle managed on-station in a subtropical climate.

The non-significant seasonal effect observed in this study on incidence of some reproductive problems contradicted earlier reports by Abdullahi (1999) and Alawa *et al.* (2001) in their studies using cattle breeds. However, this study implicated the variation due to management differences employed in rearing these species. Animals were managed sedentarily in the latter studies as opposed to the smallholder husbandry practice in this study. The non-significant seasonal effect on species in the occurrence of these problems, as explained earlier was that sheep were more prone to these problems as compared to goats and cattle.

The observed age effect on the incidence of reproductive problems in these species might be attributed to a number of factors. Firstly, the progressive decrease in the occurrence of these problems in the present study may be partly linked to under-development of tissues and organs in young animals but better development with age. This may also be attributed to low level of hormone production requisite for normal body physiological activities at younger age. In addition, high level of reproductive problems may also be linked to low resistance to certain infectious agents at tender age, as similarly reported by Zahraddeen (2006). However, the difference may also occur since low or excess tissue or fat deposition had been implicated in poor reproductive status of animals as reported by Butswat (1994). This also accounted for the high incidence of these problems in younger animals as compared to adult or old; due to their low tissue reserves which hinder normal physiological functions of the bodies.

It was also observed that occurrence of some of these problems was sex-influenced with higher incidence rates in the females than in males. The only noticeable problem in males was that of orchitis. This low incidence of the reproductive problems in the males may be partly associated with the aggressive and active nature of the males. This is an added advantage to them as they consume more feed and attain higher body weight or good body condition scores, thereby conferring more immunity to the male animals as compared to malnourished females. This difference may also be partly responsible for the presence of androgens in males which play a role in growth and attainment of puberty at an early age. Setchell *et al.* (1965) reported that the on-set of puberty is more closely related to body weight than age. Zahraddeen *et al.* (2008) showed that live weight at birth is positively correlated with the body condition score of the dam. However, low body condition scores were implicated for reduced reproductive performance of goats. These are probably the reasons responsible for the higher cases of reproductive problems in females than in males. Furthermore, year was not seen to play any significant effect on the occurrence of these problems.

CONCLUSIONS

Some ruminants managed under the smallholder husbandry system experienced colossal rate of occurrence of reproductive problems which relegated them to reduced reproductive performance level. It is, therefore, suggested the animals should be exposed to good management practices for enhanced reproduction.

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Table 1: Incidence of some reproductive problems in ruminants as influenced by species and season

Problem	Species			Season			
	Cattle	Sheep	Goats	Early Dry	Late Dry	Early Wet	Late Wet
Dystocia	0 (0.0)	41 (23.8)	31 (20.7)	11 (16.9)	29(25.4)	17(23.6)	15(16.4)
Retained Placenta	13(61.9)	26 (15.1)	51 (34.0)	22 (33.8)	23(20.2)	21(29.2)	24(26.1)
Vaginal Prolapse	0(0.0)	14(8.1)	7(4.7)	3(4.6)	5(4.4)	6(8.3)	3(3.3)
Orchitis	0 (0.0)	4(2.3)	7(4.7)	2(3.1)	3(2.6)	1(1.4)	5(5.4)
Abortion	4(19.0)	13 (7.6)	39 (26.0)	5(7.7)	18(15.8)	14(19.5)	20(21.7)
Pregnancy Toxaemia	3(14.3)	57 (33.2)	4 (2.6)	14(21.6)	27(23.7)	7(9.7)	20(21.7)
Hypocalcaemia	0(0.0)	13 (7.6)	7 (4.7)	5(7.7)	6(5.3)	5(6.9)	4(4.3)
Uterine Prolapse	1(4.8)	4(2.3)	4(2.6)	3(4.6)	3(2.6)	1(1.4)	1(1.1)
Cummulative Incidence	21	172	150	65	114	72	92
df		2				3	
X ²		87.37				30.1	
Los		**				NS	

Figures in parentheses are percentages of the values in the same column, ** $P < 0.01$, NS = Not Significant, Los = Level of significance, df = degree of freedom, X^2 = Chi-square value.

Table 2: Incidence of some reproductive problems in ruminants as influenced by sex, period and age

Problem	Sex		Period				Age		
	Male	Female	2005	2006	2007	2008	Young	Adult	Old
Dystocia	0(0.0)	72(21.7)	39(23.4)	16(21.9)	16(17.2)	1(10.0)	24(24.0)	37(21.1)	11(16.2)
Retained placenta	0(0.0)	70(21.1)	35(20.9)	26(35.7)	24(25.8)	6 (60.0)	23(23.0)	43(24.6)	22(32.4)
Vaginal Prolapse	0(0.0)	17(5.1)	12(7.2)	2(2.7)	3(3.2)	0(0.0)	11(11.0)	5(2.9)	1(1.5)
Orchitis	11 (100.0)	0(0.0)	2(1.2)	2(2.7)	6(6.5)	1(10.0)	3(3.0)	5(2.9)	3(4.4)
Abortion	0(0.0)	66(19.9)	31(18.6)	15(20.6)	13(14.0)	1(10.0)	23(23.0)	22(12.6)	1(1.5)
Pregnancy Toxaemia	0(0.0)	68(20.5)	37(22.2)	7(9.6)	19(20.4)	0(0.0)	9(9.0)	47(26.9)	23(33.7)
Hypocalcaemia	0(0.0)	20(6.0)	9(5.3)	3(4.1)	7(7.5)	1(10.0)	5(5.0)	10(5.7)	6(8.8)
Uterine Prolapse	0(0.0)	19(5.7)	2(1.2)	2(2.7)	5(5.4)	0(0.0)	2(2.0)	6(3.4)	1(1.5)
Cummulative Incidence	11	332	167	73	93	10	100	175	68
df	1		3				2		
X^2	34.00		29.15				30.35		
Los	**		NS				*		

Figures in parentheses are percentages of the values in the same column, * $P < 0.05$, ** $P < 0.01$, NS = Not Significant, Los = Level of significance, df = degree of freedom, X^2 = Chi-square value